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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--------------------------------------------------------------------------------------------------------|-------------|----------------------|---------------------|------------------|
| 10/590,744 | 05/17/2007 | Marco Friedrich | 5367-256PUS | 1203 |
| 7590 12/21/2010 | | | | |
| Thomas Langer Cohen Pontani Lieberman & Pavane 551 Fifth Avenue Suite 1210 New York, NY 10176 | | | | |
| EXAMINER | | | | |
| PATEL, ISHWARBHAI B | | | | |
| ART UNIT | | PAPER NUMBER | | |
| 2835 | | | | |
| MAIL DATE | | DELIVERY MODE | | |
| 12/21/2010 | | PAPER | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/590,744

Applicant(s)

FRIEDRICH ET AL.

Examiner

Ishwarbhai B. Patel

Art Unit

2835

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 October 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5, 7-9 and 11-32 is/are pending in the application.
- 4a) Of the above claim(s) 26-31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-9, 11-25 and 32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 October 2010 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-946)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. This action is in response to amendment filed on November 15, 2010.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 3, 4, 7-8, 11, 15, 16, 19, 21-25 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuan (US Patent No.6,860,620).

Regarding claim 1, Kuan, generally in figures 1-5, discloses a light emitting diode arrangement, comprising a flexible circuit board (103) comprising electrical conductor tracks (121, 123, 124 and 126) and a thermally conductive layer (122, 125 and 108) and at least one high power light emitting diode (102) mounted onto said flexible circuit board and in thermal contact with the thermally conductive layer (see figure), wherein the thermally conductive layer and the electrical conductor tracks are positioned in a same plane of the flexible circuit board (see figure).

Kuan does not disclose the thermally conductive layer comprises 60 % of an area of said same plane. However, as recited by Kuan, element 108 is provided to increase the heat removal from the device (column 4, line 1-8). Though the figures may

not be drawn to scale, most of the surface area is occupied by elements 122, 125 and 108. The larger the total area of elements 122, 125 and 108 better will be heat removal rate.

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to provide the board of kuan with the thermally conductive layer having 60 % of an area of said same plane, in order to have better heat removal rate.

Further, it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. *In re Aller*, 105 220 F.2d 454,456, 105 USPQ 233, 235 (CCPA 1955).

Regarding claim 3, the modified structure of Kuan further discloses the high power light emitting diode is soldered onto the flexible circuit board (column 4, line 40-50).

Regarding claim 4, the modified structure of Kuan further discloses the flexible circuit board contains at least one flexible carrier layer (103).

Regarding claim 7, the modified structure of Kuan further discloses the thermally conductive layer contains a metal (column 3, line 42-49).

Regarding claim 8, the modified structure of Kuan further discloses the thermally conductive layer contains copper (column 3, line 42-49).

Regarding claim 11, the modified structure of Kuan further discloses the thermally conductive layer and the electrical conductor tracks contain the same metal (column 3, line 42-49).

Regarding claim 15, the modified structure of Kuan further discloses side of the flexible circuit board which is remote from the high power light emitting diode has an adhesive-containing layer (104).

Regarding claim 16, the modified structure of Kuan further discloses the adhesive-containing layer is formed by a double sided adhesive tape (as it is bonded on both sides, with 103 and 105).

Regarding claim 19, the modified structure of Kuan further discloses the adhesive-containing layer is covered with a protective film (105).

Regarding claims 21-25, the modified structure of Kuan further discloses a multiplicity of high power light emitting diodes are provided, which diodes are connected in series (claim 21); a pair of contact areas is provided for each high power light emitting diode (claim 22); has sections, each section having a high power light emitting diode

and the associated pair of contact areas (claim 23); the sections are arranged as repeating structures (claim 24) and the sections are arranged in a series (claim 25), as disclosed in figure 1-5.

Regarding claim 32, the modified structure of Kuan discloses all the features of the claimed invention as applied to claim 1 above including the thermally conductive layer but does not disclose the thermally conductive layer has an essentially round form. Kuan disclose a rectangular form. However, the shape of the thermally conductive layer will depend upon the outer shape of the board which will depend upon the actual location of the diode unit and can be changed to the desired shape to have better heat removal rate.

Further, it has been held that more than a mere change of shape is necessary for patentability. *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966) and *In re Span-Deck Inc. V. Fab-con, Inc.* (CA 8, 1982) 215 USPQ 835.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the modified board of Kuan with the thermally conductive layer but does not disclose the thermally conductive layer has an essentially round form, in order to match the actual location with better heat removal rate.

4. Claims 2, 9, 12-14, 17-18, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuan (US Patent No. 6,860,620) as applied to claim 1 above.

Regarding claim 2, Kuan discloses all the features of the claimed invention as applied to claim 1, including the high power light emitting diode but does not explicitly disclose the diode with a power consumption of at least 300 mW.

However, diode with 300 mW power is known and the diode will be selected to have desired light intensity in the system.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the arrangement of Kuan with the diode having a power consumption of at least 300 mW, in order to have desired light intensity in the system.

Regarding claim 9, Kuan discloses all the features of the claimed invention as applied to claim 1, including the at least one high power light emitting diode and the thermally conductive layer but does not disclose the high power light emitting diode is soldered onto the thermally conductive layer. Kuan discloses the using a thermally conductive glue.

However, soldering the diode to the thermally conductive layer is old and known in the art to have better structural connection.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the arrangement of Kuan with the high power light emitting diode soldered onto the thermally conductive layer, in order to have better structural connection.

Regarding claims 17 and 18, Kuan discloses all the features of the claimed invention as applied to claim 1, including the adhesive-containing layer but does not disclose the adhesive-containing layer is heat-resistant up to temperatures of 250.degree. C. and the adhesive-containing layer has a thickness of at most 60 μm .

However, the adhesive layer is connected to thermally conductive layer and also transmit the heat. Therefore should be able to withstand the heat generated as well thin enough to transmit the heat as fast as possible.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the arrangement of Kuan with the adhesive-containing layer having heat-resistant up to temperatures of 250.degree. C. and the adhesive-containing layer having a thickness of at most 60 μm , to withstand the temperature without damage and to transmit the heat as fast as possible.

Regarding claim 20, Kuan discloses all the features of the claimed invention as applied to claim 1, including the protective film but does not disclose the protective film contains a plastic. However, depending upon use, if the system is to be used on another fixture which it self is going to work as a heat sink, the heat sink may not be attached to the arrangement but a plastic removable sheet is attached, which is known in the art.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the arrangement of Kuan with the protective film contains a plastic, in order to facilitate the storage of the arrangement before actual use.

Regarding claims 12-14, Kuan discloses all the features of the claimed invention as applied to claim 1, including the flexible circuit board but does not disclose an insulating layer is applied to one of the surfaces of the flexible circuit board (claim 12); the insulating layer has cutouts for making electrical and thermal contact with the high power light emitting diode (claim 13) and the insulating layer contains a soldering resist (claim 14).

However, providing solder mask on the board is old and known in the art to protect the surface from environmental damage.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the arrangement of Kuan with the insulating layer containing a solder mask as recited in claims 12-14, in order to protect the surface from environmental damage.

5. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuan as applied to claim 4 above, and further in view of Becker (US Patent No. 7,273,987).

Regarding claim 5, Kuan discloses all the features of the claimed invention as applied to claim 1, including the flexible carrier layer but does not disclose the layer contains at least one of the following materials: polyimide, polyethylene naphthalate, polyester, FR4. Kuan discloses synthetic material such as polyamide (column 3, line 15-20).

Becker discloses light emitting diode arrangement and recite the flexible substrate made of polyimide (column 4, line 46-67).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the arrangement of Kuan with the flexible substrate made of polyimide.

Further, it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin* 227 F.2d 197, 125 USPQ 416 (CCPA 1960)).

Response to Arguments

6. Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) / new explanation of rejection.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ishwarbhai B. Patel whose telephone number is (571) 272 1933. The examiner can normally be reached on M-F (8:30 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jinhee Lee can be reached on (571) 272 1977. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.